

AW-CU570-EVB

**Wireless MCU with Integrated Tri-radio Wi-Fi 6
+ Bluetooth Low Energy 5.3 /802.15.4**

15mm x 28mm LGA Module

User Guide

Rev. 01

(For Standard)

1

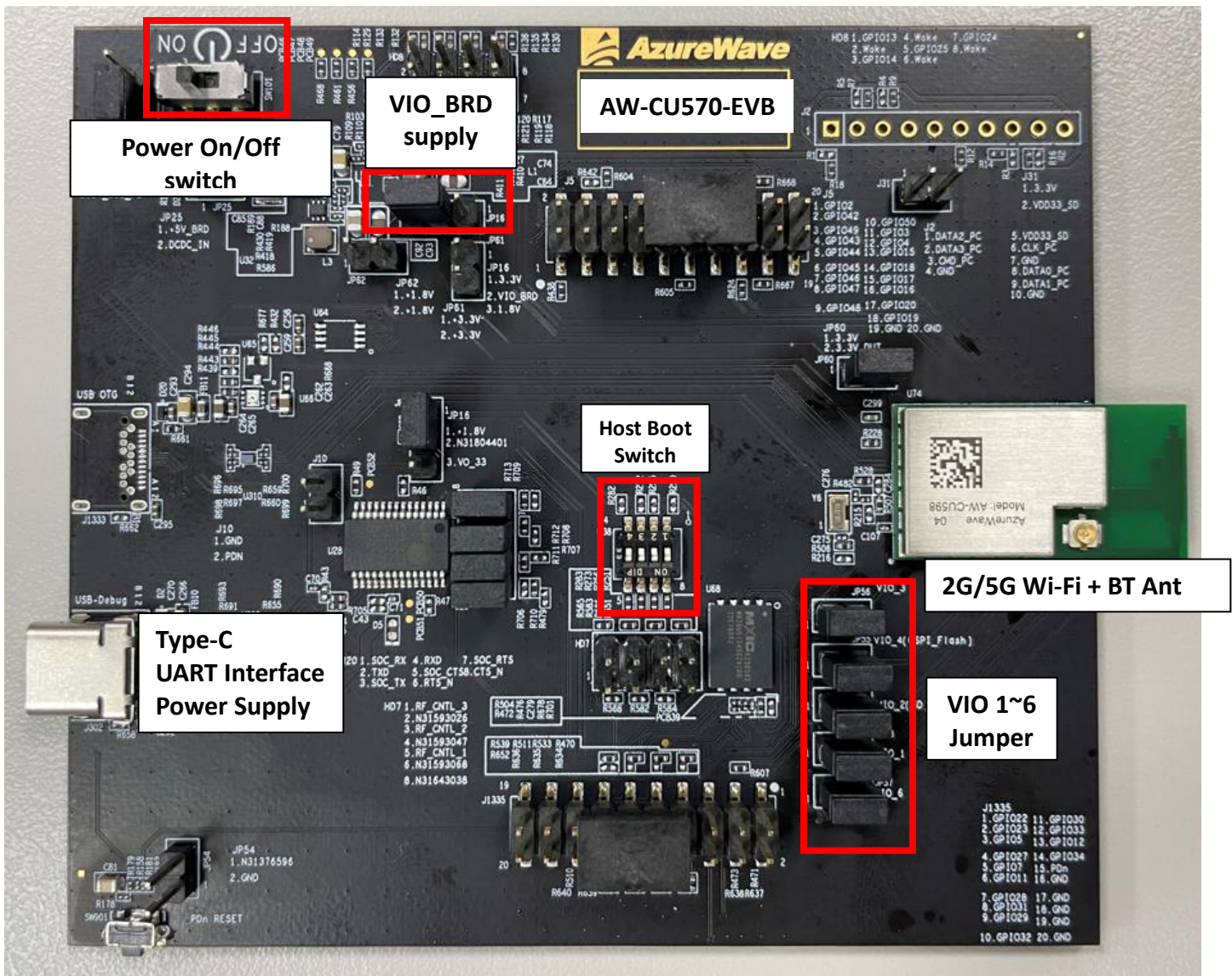
Revision History

Version	Revision Date	Description	Initials	Approved
01	2024/01/22	● Initial Version	Roger Liu	N.C. Chen

1. System Setup

1-1. Hardware Requirements

- AW-CU570-EVB (evaluation board of AW-CU570)
- SDIO/UART interface supported (USB port needed)
- Windows system(OS later than Windows) for Labtool.
- Vector Signal Analyzer/WLAN analyzer for transmit measurements.
- WLAN signal generator for receiver measurements.
- RF isolation chamber for receive measurements.
- RF attenuators
- RF cable



AW-CU570-EVB

1.1.1 For VIO_BRD supply
For **VIO_BRD supply** VDDIO(1.8V), please connect JP16(2-3).
For **VIO_BRD supply** VDDIO(3.3V), please connect JP16(1-2).

1.1.2 For Config Host Boot (ON DIP side is 0)
For **ISP boot**, please connect U38(1110).
For **Boot from QSPI Flash**, please connect U38(1111).

1-2. Software package requirement

a. USB-UART driver

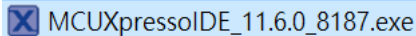
b. MCUXpressoIDE_11.6.0_8187.exe

c. MFG or Normal FW image

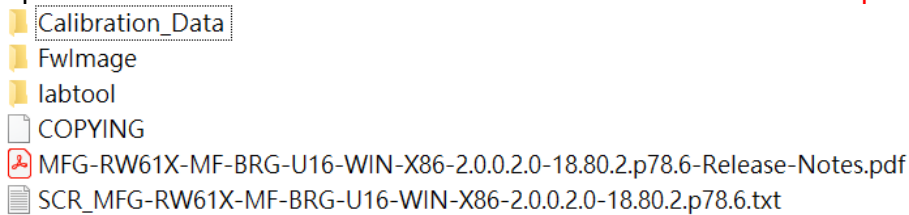
1-2-1.Windows PC set up (USB-UART)

After download the SW package from AzureWave contact window, please build the driver first.

Install **MCUXpressoIDE_11.6.0_8187.exe**

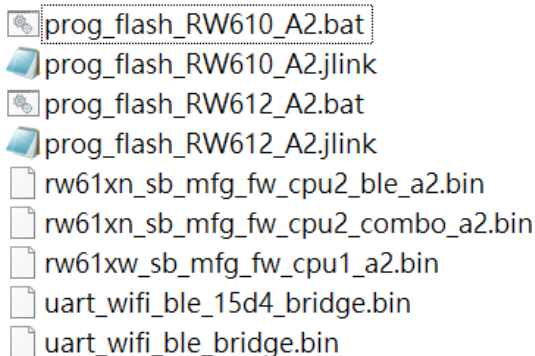


Open the **MFG-RW61X-MF-BRG-U16-WIN-X86-2.0.0.2.0-18.80.2.p78.6** and you can see below contents.



- Calibration_Data
- FwImage
- labtool
- COPYING
- MFG-RW61X-MF-BRG-U16-WIN-X86-2.0.0.2.0-18.80.2.p78.6-Release-Notes.pdf
- SCR_MFG-RW61X-MF-BRG-U16-WIN-X86-2.0.0.2.0-18.80.2.p78.6.txt

Go into A2 folder under the FwImage folder you can see the files below, copy all files to C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries

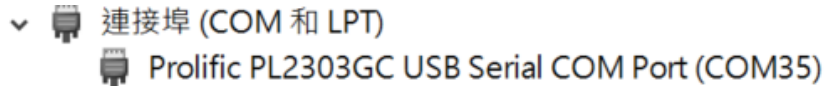


- prog_flash_RW610_A2.bat
- prog_flash_RW610_A2.jlink
- prog_flash_RW612_A2.bat
- prog_flash_RW612_A2.jlink
- rw61xn_sb_mfg_fw_cpu2_ble_a2.bin
- rw61xn_sb_mfg_fw_cpu2_combo_a2.bin
- rw61xw_sb_mfg_fw_cpu1_a2.bin
- uart_wifi_ble_15d4_bridge.bin
- uart_wifi_ble_bridge.bin

Connect USB-to-UART type C port to your PC, if the com port is not recognized Number, must install the Driver “[PL23XX_Prolific_DriverInstaller_v408](#)”

Install the driver manually. You can get the driver from Prolific's web site.
https://www.prolific.com.tw/US/ShowProduct.aspx?p_id=225&pcid=41

The installation is successful, find the com port number.



1-3. Start Write firmware image and DUT testing

1-3-1 Windows PC side (Normal Mode operation)

Switch U38 to ISP boot mode and then connect USB-to-UART type C port to your PC. Execute the command in C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries and edit your com port number.

```
blhost.exe -p COM5 -t 3 get-property 1
blhost.exe -p COM5 -t 60000 fill-memory 0x20001000 0x4 0xC0000008
blhost.exe -p COM5 -t 60000 configure-memory 0x9 0x20001000
blhost.exe -p COM5 -t 60000 flash-erase-region 0x8000000 0x8000000
blhost.exe -p COM5 -t 60000 write-memory 0x8400000 images\rw610_sb_wifi_v1.bin
blhost.exe -p COM5 -t 60000 write-memory 0x8540000 images\rw610_sb_ble_v1.bin
blhost.exe -p COM5 -t 60000 write-memory 0x8000000 images\rdrw612qfn_wifi_cli.bin
```

Execution command

And automatically close the window after writing.

```
C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 3 get-property 1
Ping responded in 1 attempt(s)
Inject command 'get-property'
Response status = 0 (0x0) Success.
Response word 1 = 1258488064 (0x4b030100)
Current Version = K3.1.0

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 60000 fill-memory 0x20001000 0x4 0xC0000008
Ping responded in 1 attempt(s)
Inject command 'fill-memory'
Successful generic response to command 'fill-memory'
Response status = 0 (0x0) Success.

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 60000 configure-memory 0x9 0x20001000
Ping responded in 1 attempt(s)
Inject command 'configure-memory'
Successful generic response to command 'configure-memory'
Response status = 0 (0x0) Success.

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 60000 flash-erase-region 0x8000000 0x8000000
Ping responded in 1 attempt(s)
Inject command 'flash-erase-region'
Successful generic response to command 'flash-erase-region'
Response status = 0 (0x0) Success.

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>REM blhost.exe -p COM -t 60000 write-memory 0x8400000 payload_cpu1_wifi.bin
C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>REM blhost.exe -p COM -t 60000 write-memory 0x8540000 payload_cpu2_ble.bin
C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>REM blhost.exe -p COM -t 60000 write-memory 0x8000000 uart_MFG_bridge_wlan_ble_cpu3withfcb.bin
```

```
C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 60000 write-memory 0x8400000 rw610_sb_wifi_v1.bin
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 517660 (0x7e61c) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)100% Completed!
Successful generic response to command 'write-memory'
Response status = 0 (0x0) Success.
Wrote 517660 of 517660 bytes.

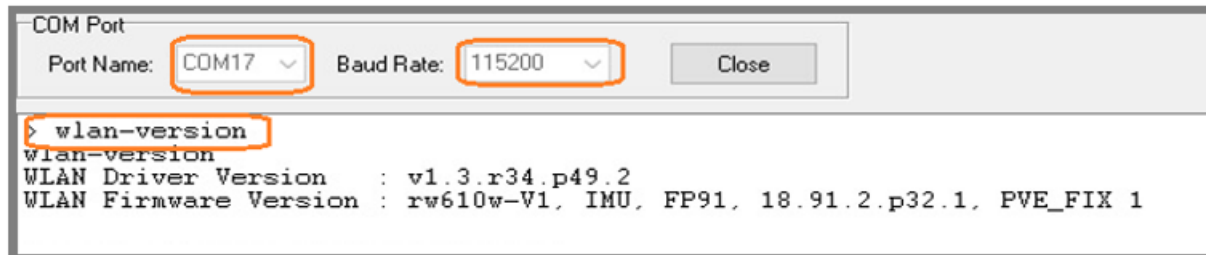
C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 60000 write-memory 0x8540000 rw610_sb_ble_v1.bin
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 136016 (0x21350) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)100% Completed!
Successful generic response to command 'write-memory'
Response status = 0 (0x0) Success.
Wrote 136016 of 136016 bytes.

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM16 -t 60000 write-memory 0x8000000 rdw612qfn_wifi_cli.bin
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 747184 (0xb66b0) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)100% Completed!
Successful generic response to command 'write-memory'
Response status = 0 (0x0) Success.
Wrote 747184 of 747184 bytes.
```

Here is a Normal Mode operation example;
Please **switch U38 to Boot from QSPI Flash and restart DUT** after programming flash

Open the Terminal window and set com port 17 and baud-rate as 115200

Execute the command: wlan-version



```
COM Port
Port Name: COM17 Baud Rate: 115200 Close
> wlan-version
wlan-version
WLAN Driver Version : v1.3.r34.p49.2
WLAN Firmware Version : rw610w-V1, IMU, FP91, 18.91.2.p32.1, PVE_FIX 1
```

Execute the command: wlan-scan

```
> wlan-scan
# wlan-scan
Scan scheduled...

# 6 networks found:
00:01:02:03:04:05 "CMW-AP" Infra
  channel: 1
  rssi: -71 dBm
  security: OPEN
  WMM: YES
24:DE:C6:1D:12:C0 "SWSDFPLDEV" Infra
  channel: 6
  rssi: -98 dBm
  security: WPA2 Enterprise
  WMM: YES
24:DE:C6:1D:12:C3 "SWSDFPLNET" Infra
  channel: 6
  rssi: -97 dBm
  security: WPA2 Enterprise
  WMM: YES
10:0C:6B:9A:E6:E8 "DQA_2.4G" Infra
  channel: 7
  rssi: -79 dBm
  security: OPEN
  WMM: YES
```

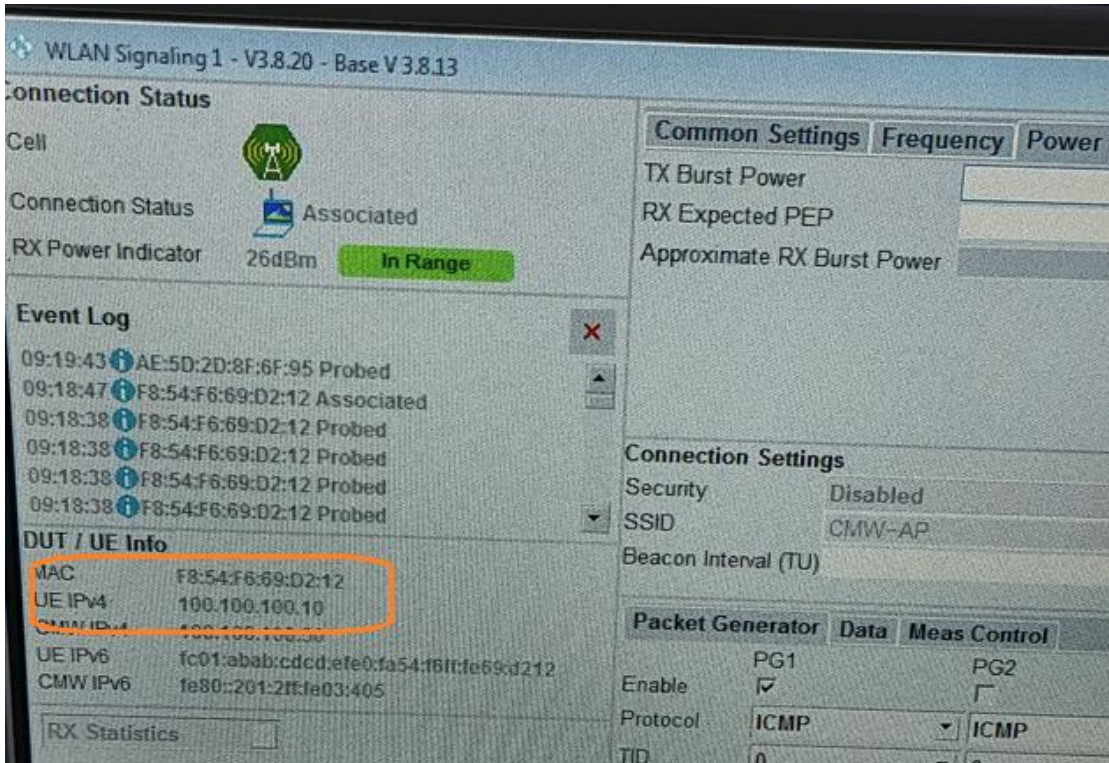
Execute the command: wlan-add 1 ssid CMW-AP
Execute the command: wlan-connect 1

```
> wlan-add 1 ssid CMW-AP
wlan-add 1 ssid CMW-AP
Added "1"

> wlan-connect 1
# wlan-connect 1
Connecting to network...
Use 'wlan-stat' for current connection status.

# =====
app_cb: WLAN: received event 1
=====
app_cb: WLAN: authenticated to network
=====
app_cb: WLAN: received event 0
=====
app_cb: WLAN: connected to network
Connected to following BSS:
SSID = [CMW-AP]
IPv4 Address: [100.100.100.10]
IPv6 Address: Link-Local FE80::FA54:F6FF:FE69:D212 (Preferred)
```

Connect to tester CMW-AP and show DUT information.



1-3-2. Windows PC side (MFG Mode operation)

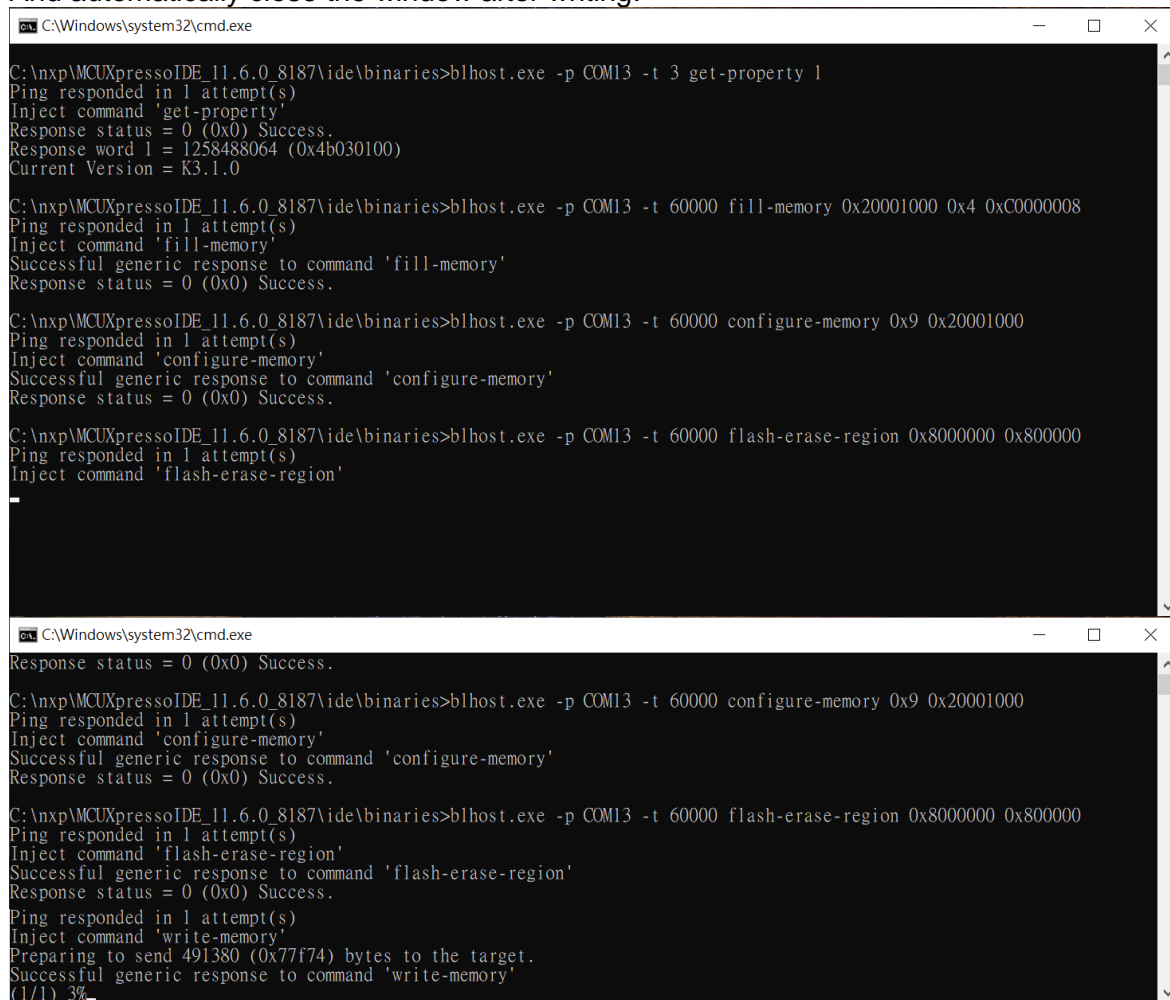
Switch U38 to ISP boot mode and then connect USB-to-UART type C port to your PC.

Execute the command in C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries and edit your com port number.

```
blhost.exe -p COM11 -t 3 get-property 1
blhost.exe -p COM11 -t 60000 fill-memory 0x20001000 0x4 0xC0000008
blhost.exe -p COM11 -t 60000 configure-memory 0x9 0x20001000
blhost.exe -p COM11 -t 60000 flash-erase-region 0x8000000 0x800000
blhost.exe -p COM11 -t 60000 write-memory 0x8400000 rw610w_mfg_sfw_cpu1.bin
blhost.exe -p COM11 -t 60000 write-memory 0x8540000 rw610n_mfg_sfw_cpu2.bin
blhost.exe -p COM11 -t 60000 write-memory 0x8000400 uart_wifi_ble_bridge.bin
```

Execution command

And automatically close the window after writing.



The image shows two screenshots of a Windows command prompt window. The top screenshot shows the execution of several blhost.exe commands: 'get-property 1', 'fill-memory', 'configure-memory', and 'flash-erase-region'. The bottom screenshot shows the execution of 'configure-memory', 'flash-erase-region', and 'write-memory' commands. The output for each command indicates a successful generic response.

```

C:\Windows\system32\cmd.exe
C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 3 get-property 1
Ping responded in 1 attempt(s)
Inject command 'get-property'
Response status = 0 (0x0) Success.
Response word 1 = 1258488064 (0x4b030100)
Current Version = K3.1.0

C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 fill-memory 0x20001000 0x4 0xC0000008
Ping responded in 1 attempt(s)
Inject command 'fill-memory'
Successful generic response to command 'fill-memory'
Response status = 0 (0x0) Success.

C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 configure-memory 0x9 0x20001000
Ping responded in 1 attempt(s)
Inject command 'configure-memory'
Successful generic response to command 'configure-memory'
Response status = 0 (0x0) Success.

C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 flash-erase-region 0x8000000 0x800000
Ping responded in 1 attempt(s)
Inject command 'flash-erase-region'
-

C:\Windows\system32\cmd.exe
Response status = 0 (0x0) Success.

C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 configure-memory 0x9 0x20001000
Ping responded in 1 attempt(s)
Inject command 'configure-memory'
Successful generic response to command 'configure-memory'
Response status = 0 (0x0) Success.

C:\nxp\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 flash-erase-region 0x8000000 0x800000
Ping responded in 1 attempt(s)
Inject command 'flash-erase-region'
Successful generic response to command 'flash-erase-region'
Response status = 0 (0x0) Success.

Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 491380 (0x77f74) bytes to the target.
Successful generic response to command 'write-memory'
(1/1) 3%_

```



```

C:\Windows\system32\cmd.exe
Successful generic response to command 'flash-erase-region'
Response status = 0 (0x0) Success.

Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 491380 (0x77f74) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)100% Completed!
Successful generic response to command 'write-memory'
Response status = 0 (0x0) Success.
Wrote 491380 of 491380 bytes.

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 write-memory 0x8540000 rw610n_mfg_sfw_cpu2.bi
n
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 113532 (0x1bb7c) bytes to the target.
Successful generic response to command 'write-memory'
(1/1) 9%_

C:\Windows\system32\cmd.exe
C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 write-memory 0x8400000 rw610w_mfg_sfw_cpul.bi
n
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 491380 (0x77f74) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)100% Completed!
Successful generic response to command 'write-memory'
Response status = 0 (0x0) Success.
Wrote 491380 of 491380 bytes.






C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 write-memory 0x8540000 rw610n_mfg_sfw_cpu2.bi
n
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 113532 (0x1bb7c) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)100% Completed!
Successful generic response to command 'write-memory'
Response status = 0 (0x0) Success.
Wrote 113532 of 113532 bytes.

C:\npx\MCUXpressoIDE_11.6.0_8187\ide\binaries>blhost.exe -p COM13 -t 60000 write-memory 0x8000400 uart_wifi_ble_bridge.b
in
Ping responded in 1 attempt(s)
Inject command 'write-memory'
Preparing to send 41975 (0xa3f7) bytes to the target.
Successful generic response to command 'write-memory'
(1/1)23%_

```

1-3-3. Windows PC side

Open the labtool under [MFG-RW61X-MF-BRG-U16-WIN-X86-2.0.0.2.0-18.80.2.p78.6](#) can to see the following content.

 AddCalDLL.dll	2023/12/1 下午 09:10	應用程式擴充	1,140 KB
 DutApiSisoApApp_RW610.exe	2023/12/1 下午 09:10	應用程式	390 KB
 DutApiSisoApAppUartDII.dll	2023/12/1 下午 09:10	應用程式擴充	543 KB
 DutApiSisoApAppUartDII.lib	2023/12/1 下午 09:10	LIB 檔案	157 KB
 SetUp.ini	2023/12/19 上午 11:57	組態設定	6 KB
 Test.txt	2023/12/19 下午 12:00	文字文件	2 KB
 TF_Config_20MHz.txt	2023/12/1 下午 09:10	文字文件	3 KB

Edit the "SetUp.ini" file as shown in the lines highlighted in **RED** below.

- a. The setup DutilAddress will be the COM PORT address of your target.

```
[COMSET]
```

```
ComNo = 9
```

```
BaudRate = 115200
```

```
byParity = 0
```

```
byStopBits = 1
```

```
byByteSize = 8
```

- b. The setup **NO_EEPROM** is the storage type to get/set function.

```
[DutInitSet]
```

```
;0 - EEPROM support
```

```
;1 - NO_EEPROM support
```

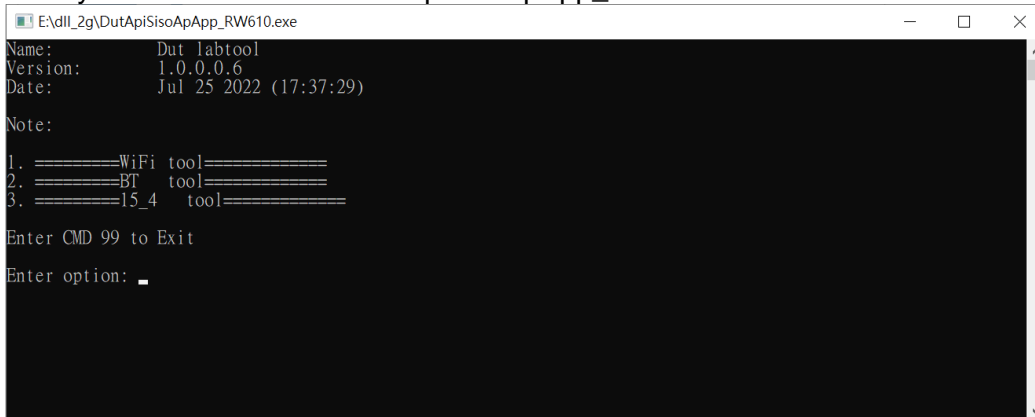
```
;2 - OTP support
```

```
NO_EEPROM=2
```

- 1 - NO_EEPROM support → Set storage type to .conf calibration file in labtool folder.
- 2 - OTP support → Set storage type to OTP in DUT

First make sure the switch is in read mode.

Then you can double click "DutApiSisoApApp_RW610.exe" to enter labtool as below picture.



```
E:\dll_2g\DutApiSisoApApp_RW610.exe
Name:      Dut labtool
Version:   1.0.0.0.6
Date:      Jul 25 2022 (17:37:29)

Note:
1. =====WiFi tool=====
2. =====BT  tool=====
3. =====15_4  tool=====

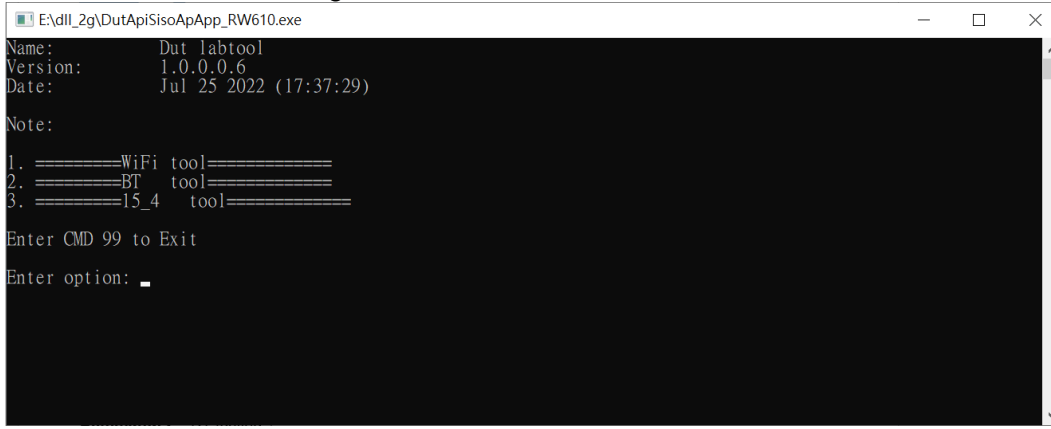
Enter CMD 99 to Exit
Enter option: _
```

2.RF Command

As the information showed on your screen, please enter these commands below to start your test.

Command: 1 Wi-Fi testing

Command: 2 BT testing



```

E:\dll_2g\DutApiSisoAppApp_RW610.exe
Name:      Dut labtool
Version:   1.0.0.6
Date:      Jul 25 2022 (17:37:29)

Note:

1. =====WiFi tool=====
2. =====BT  tool=====
3. =====15_4  tool=====

Enter CMD 99 to Exit

Enter option: _

```

2-1. Generate 802.11a/b/g/n Packet commands

a. Tx on CH 6 at 15 dBm with a CCK-11Mbps data rate in 20 MHz BW mode

```

44 2           //Set storage type to OTP
35 0 0         // Stop Tx
6 11 0        // Set 2.4G mode
112 0 0       // Set to 20 MHz BW
12 0 6        // Set to ch6
35 0 1 4 15   // Enable Output Power at 15 dBm with CCK-11M Data Rate with b mode

```

b. Tx on CH 6 at 12 dBm with an OFDM-54Mbps data rate in 20 MHz BW mode

```

44 2           //Set storage type to OTP
35 0 0         // Stop Tx
6 11 0        // Set 2.4G mode
112 0 0       // Set to 20 MHz BW
12 0 6        // Set to ch6
35 0 1 13 12  // Enable Output Power with at 12 dBm OFDM-54M Data Rate with g mode

```

c. Tx on CH 6 at 10 dBm with a MCS0 Data rate in 20 MHz BW mode

```

44 2           //Set storage type to OTP
35 0           // Stop Tx
6 11 0        // Set 2.4G mode
112 0 0       // Set to 20 MHz BW
12 0 6        // Set to ch6
35 0 1 15 10  // Enable Output Power at 10 dBm with MCS0 Data Rate with n mode

```

d. Tx on CH 36 at 16 dBm with a OFDM-54Mbps rate in 20 MHz BW Mode

```

44 2 //Set storage type to OTP
35 0 0 // Stop Tx
6 3 0 // Set 5G mode
112 0 0 // Set to 20 MHz BW
12 0 36 // Set to ch36
35 0 1 13 16 // Enable Output Power at 16 dBm with OFDM-54M Data Rate with a mode
  
```

Data rate set up table

B mode & G mode:

1Mbps	2Mbps	5.5Mbps	11Mbps	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps
1	2	3	4	6	7	8	9	10
36Mbps	48Mbps	54Mbps						
11	12	13						

N mode:

MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
15	16	17	18	19	20	21	22	

AC mode:

VHT Data Rates:

1100 for VHT_SS1_MCS0	1101 for VHT_SS1_MCS1	1102 for VHT_SS1_MCS2
1103 for VHT_SS1_MCS3	1104 for VHT_SS1_MCS4	1105 for VHT_SS1_MCS5
1106 for VHT_SS1_MCS6	1107 for VHT_SS1_MCS7	1108 for VHT_SS1_MCS8
1109 for VHT_SS1_MCS9		

AX mode:

HE Data Rates:

2100 for HE_SS1_MCS0	2101 for HE_SS1_MCS1	2102 for HE_SS1_MCS2
2103 for HE_SS1_MCS3	2104 for HE_SS1_MCS4	2105 for HE_SS1_MCS5
2107 for HE_SS1_MCS7	2108 for HE_SS1_MCS8	2109 for HE_SS1_MCS9
2110 for HE_SS1_MCS10	2111 for HE_SS1_MCS11	

2-2. Test RX sensitivity Commands

a. Rx on CH 6 in 20 MHz BW Mode

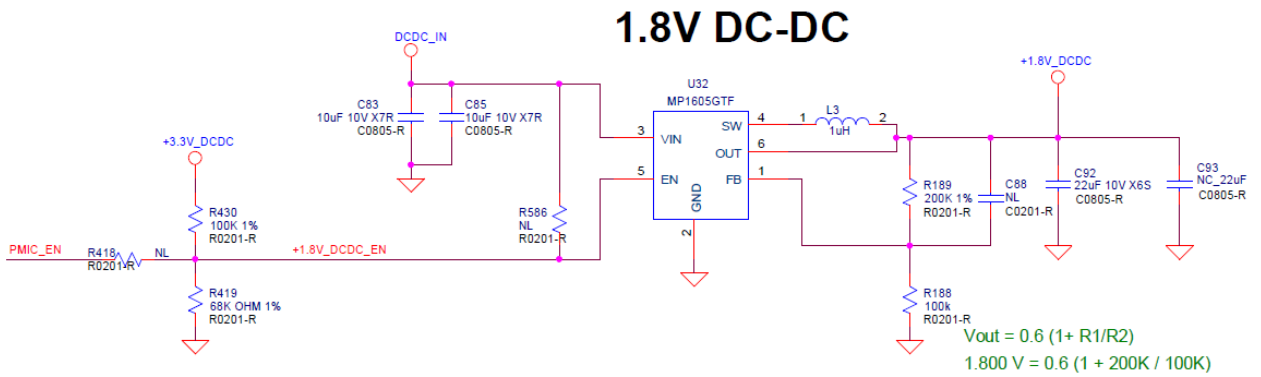
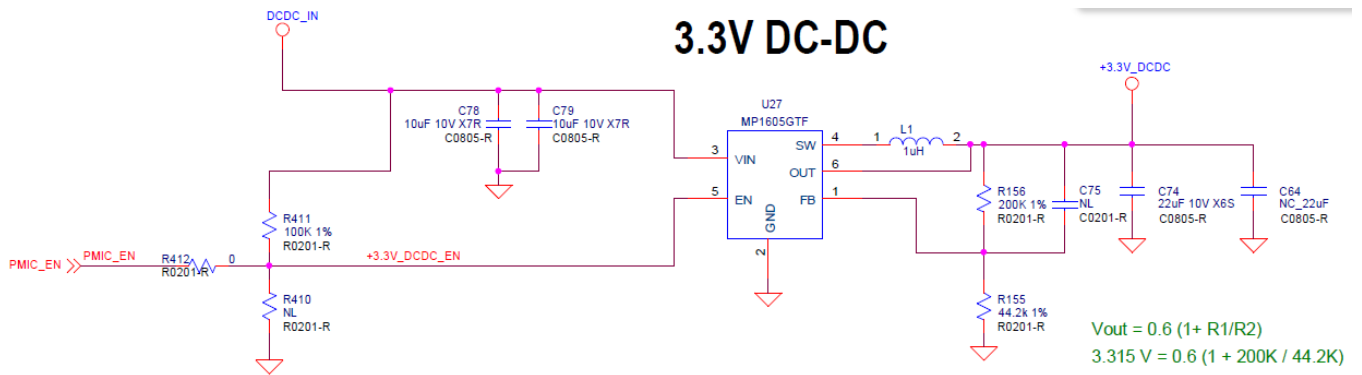
```

44 2 //Set storage type to OTP
35 0 0 // Stop Tx
6 11 0 // Set 2.4G
112 0 0 // Set to 20 MHz BW
12 0 6 // Set to CH 6
31 0 // Clear all the received packets
32 0 // Get Rx Packet Count and then clear the Rx packet counter
  
```

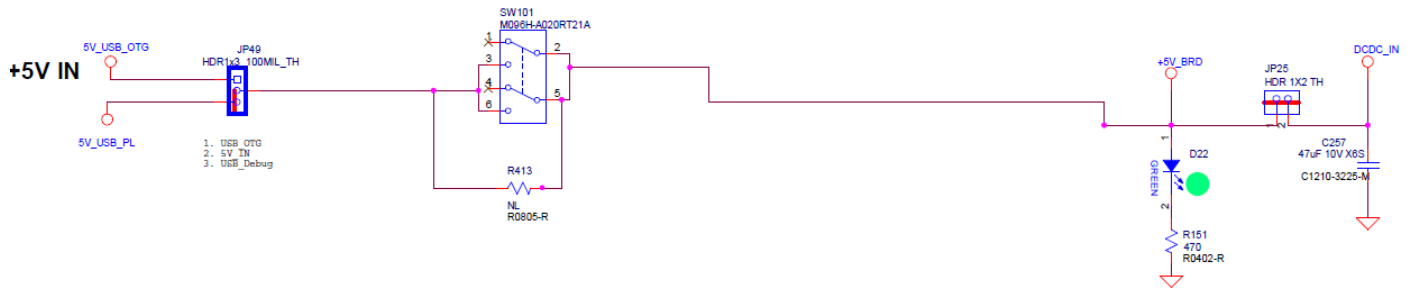
2-3 Others Commands

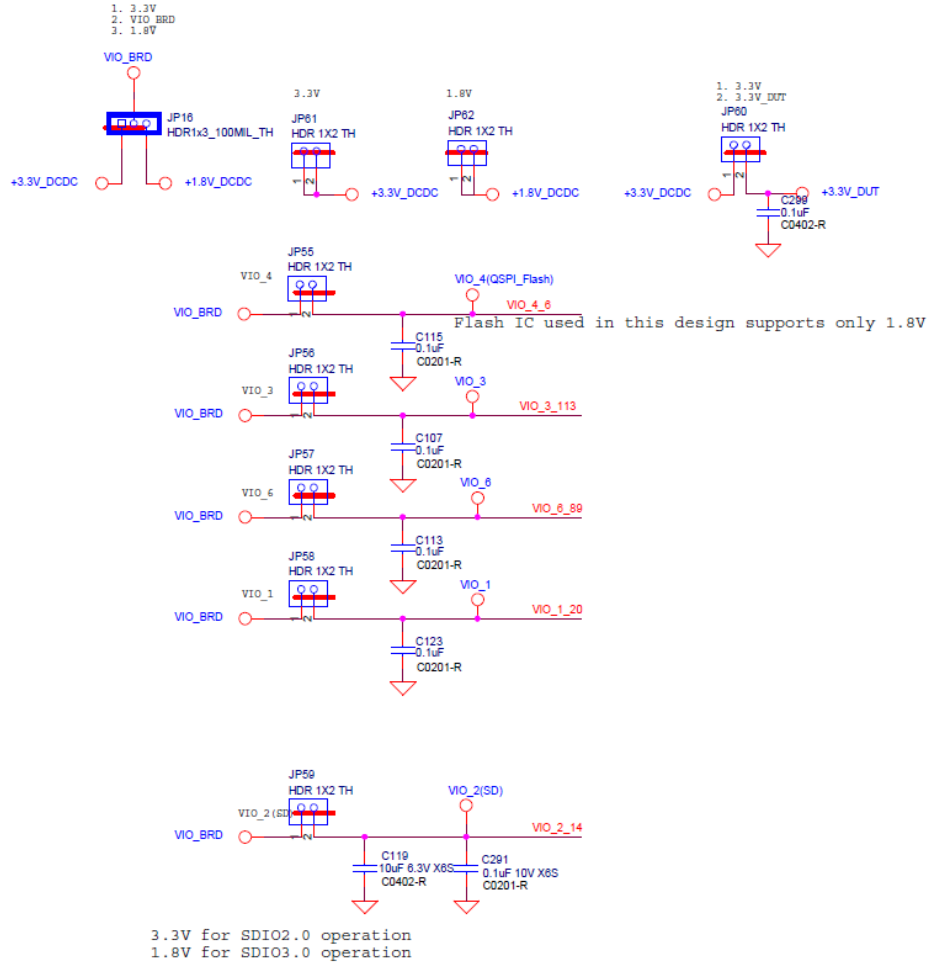
- (1) **Command 45**→ Check the MAC
- (2) **Command 99**→ Quit the test mode/ Quit the MFG tool

3. EVB schematic

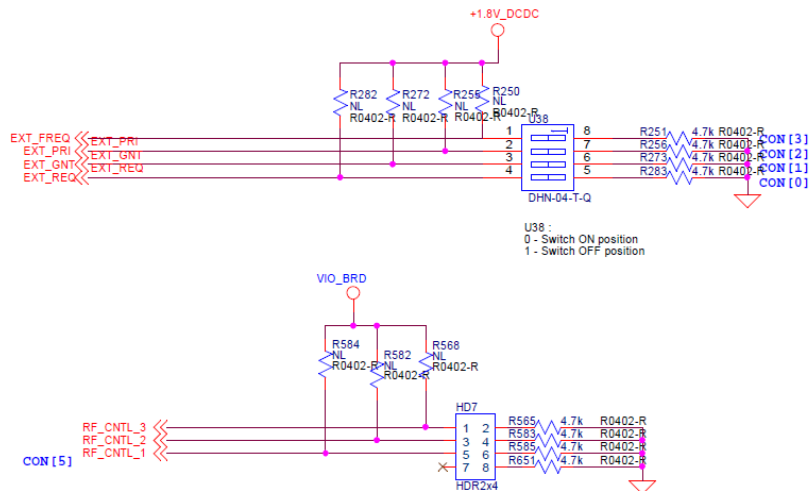


Power Entry with reverse polarity and over-voltage protection





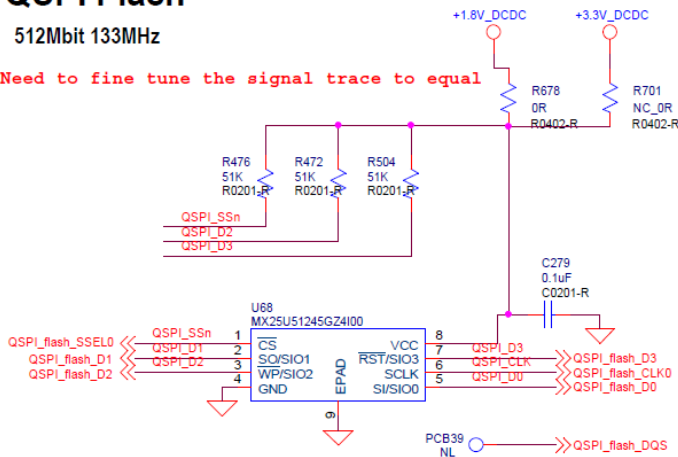
STRAP CONFIG



QSPI Flash

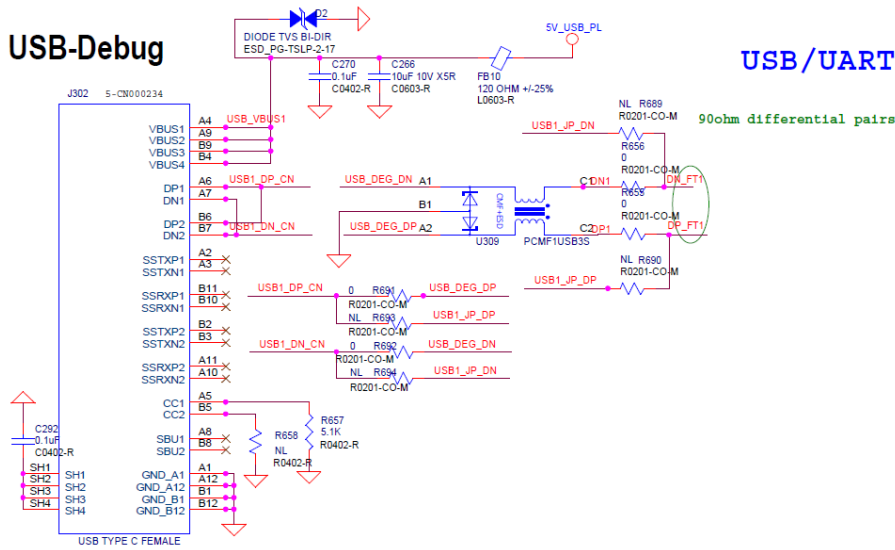
512Mbit 133MHz

Need to fine tune the signal trace to equal



USB-Debug

USB/UART



PL2303

